

**REGION II RST2 HEALTH AND SAFETY PLAN
EMERGENCY RESPONSE / REMOVAL ASSESSMENT
(Revised 28 April 2008)**

**OSC
COPY**

TDD No. TO-0009-0027

Site Name: Cornell-Dubilier Electronics

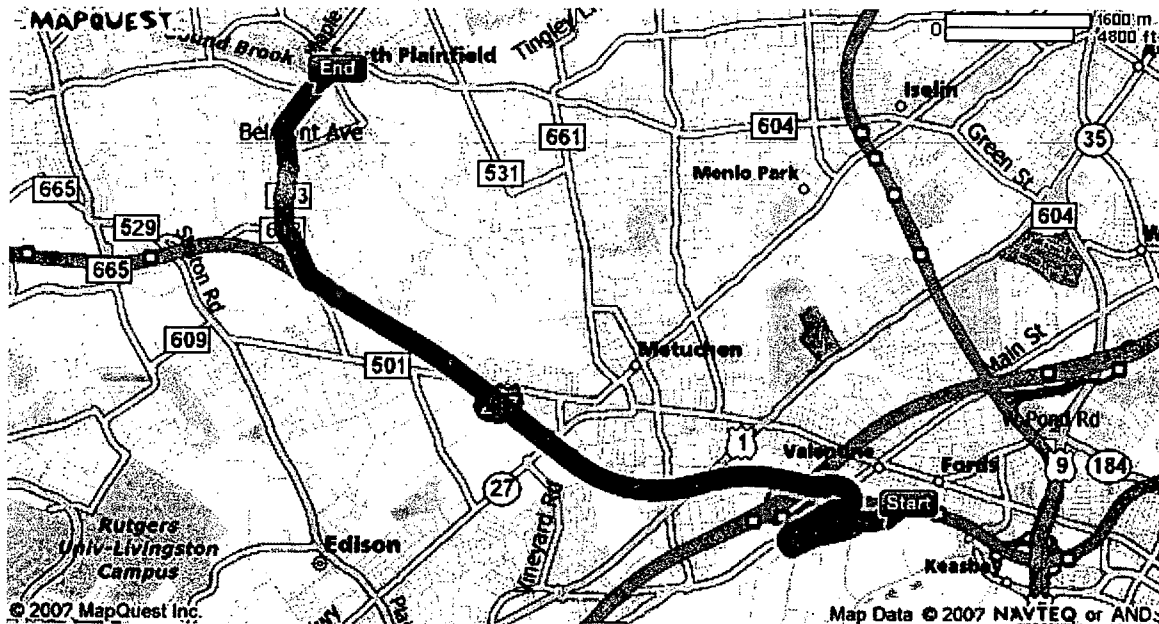
Site Address: Street No. 333 Hamilton Blvd
City South Plainfield
County/State Middlesex, New Jersey

181560



Directions to Site:

1. Start out going WEST on King Georges Post RD toward Clearview Ave (0.8 mi) 2. Merge onto Woodbridge Ave/CR-514E toward I-287/ New Jersey Turnpike/Rt. 440/Garden State Parkway (0.4 mi) 3. Take the New Jersey Turnpike ramp (0.2 mi) 4. Merge onto I-287 N via the exit on the Left (4.8 mi) 5. Take the Durham Ave exit –Exit 4- toward S Plainfield (0.2 mi) 6. Turn Right onto Durham Ave (0.4 mi) 7. Durham Ave becomes CR-603 (1.2 mi) 8. Stay Straight to go onto Hamilton Blvd (<0.1 mi) 9. Arrive at 333 Hamilton Blvd



Historical/Current Site Information:

The site known as Cornell-Dubilier Electronics is located at 333 Hamilton Blvd, South Plainfield, New Jersey. The site is the location of a former manufacturer of electronic parts and components, including capacitors. Cornell-Dubilier Electronics, Inc. also tested transformer oils. During their operations, the company dumped PCB-contaminated materials and other hazardous substances directly onto the soil at the site. The Site is on the National Priorities List and is being remediated by the EPA Remedial Program and the U.S. Army Corps of Engineers. Currently, the buildings at the Site are being demolished. The Site is approximately 25 acres in size, including an open field and adjoining wetland complex. The Bound Brook traverses the southeast corner of the Site.

In 1997, the Removal Action Branch (RAB) and START collected sediment and soil samples along 2.4 miles of the Bound Brook. In 1999, the floodplain of the Bound Brook was sampled. In December 2007, RST 2 conducted a sampling event with the purpose of recreating a portion of the 1997 sampling event to determine if there have been any changes in the PCB concentrations since the 1997 sampling event. Sediment and water samples were collected at 50' intervals from forty-four (44) locations along a half-mile stretch of the Bound Brook (Reaches 1-4 from the 1997 sampling event). Sediment samples were obtained from the center of the stream bed and from 2 locations along the north and south banks of the Bound Brook, approximately 5 feet and 10 feet from each stream bank (0-6 inch and 18-24 inch depths). Water samples were also collected from the center of the stream. An approximate total of 440 sediment samples were collected during the investigation.

RST 2 Scope of Work:

RST 2 personnel will investigate several areas along Reaches 1 and 2 in search of any visible capacitors. RST 2 will conduct a visual inspection of the "wetland area" and stream bed to locate any capacitors or oil laden wooden blocks. Any found items of interest will be marked, numbered, photographed and the coordinates of the location will be collected using GPS. Some items may be moved to a staging area in 5-gallon buckets. Field work will be for approximately one day. Date of Mobilization: Tuesday, July 8, 2008.

Incident Type: ☐ Emergency Response -
 ☐ Removal Assessment -
 ☐ Residential Sampling / Investigation -
 ☐ PRP Oversight -
 ☒ Removal Action – 7/08/2008

Location Class: ☐ Industrial ☒ Commercial ☐ Urban/Residential ☐ Rural

U.S. EPA Contact: James Kearns

Date of Initial Site Activities: 7 / 03 / 2008

Original HASP: Yes or No No

Modification Number: 0

Lead RST2: John Brennan

Site Health & Safety Coordinator: John Brennan

Health & Safety Alternate: Kelly Scott

Response Activities/Dates of Response (fill in as applicable)

Emergency Response: ☐ Perimeter Recon.
 ☐ Site Entry
 ☐ Visual Documentation
 ☐ Multi-Media Sampling
 ☐ Decontamination

Assessment: ☒ Perimeter Recon. - 7/03/08
 ☒ Site Entry - 7/03/08; 7/08/08
 ☒ Visual Documentation - 7/08/08
 ☐ Multi-Media Sampling - N/A
 ☒ Decontamination - 7/08/08

Physical Safety Hazards to Personnel

- | | |
|---|---|
| <input checked="" type="checkbox"/> Heat – <i>Attach FLD05</i> | <input type="checkbox"/> Cold – <i>Attach FLD06</i> |
| <input type="checkbox"/> Precipitation – <i>Attach FLD02</i> | <input type="checkbox"/> Confined Space |
| <input checked="" type="checkbox"/> Terrain – <i>Attach FLD11</i> | <input type="checkbox"/> Noise– <i>Attach FLD01</i> |
| <input checked="" type="checkbox"/> Walking/Working Surfaces | <input type="checkbox"/> Fire & Explosion |
| <input type="checkbox"/> Oxygen Deficiency | <input type="checkbox"/> Underground Utilities– <i>Attach FLD34</i> |
| <input type="checkbox"/> Overhead Utilities | <input type="checkbox"/> Heavy Equipment – <i>Attach FLD22</i> |
| <input type="checkbox"/> Unknowns in Drums, Tanks | <input type="checkbox"/> Ponds, Lagoons, Impoundments |
| <input type="checkbox"/> Waterways – <i>Attach FLD19</i> | <input type="checkbox"/> Pressurized Containers, Systems – <i>Attach FLD16</i> |
| <input type="checkbox"/> Illumination – <i>Attach FLD39</i> | <input type="checkbox"/> Noise– <i>Attach FLD01</i> |
| <input type="checkbox"/> Nonionizing Radiation | <input type="checkbox"/> Ionizing Radiation |
| <input type="checkbox"/> Excavations– <i>Attach FLD28</i> | <input type="checkbox"/> Elevated Work Surfaces / Manlifts – <i>Attach FLD24</i> |
| | <input checked="" type="checkbox"/> Working over or near water – <i>Attach FLD 19</i> |

While working on the slopes and banks of the Bound Brook, employees should give special attention to the briars / thorny vegetation that is pervasive up and down the creek. Avoid walking through patches of briars and if necessary, use shears to clear the vegetation. In addition, each employee should wear chest or hip waders when working in the vicinity of or in the creek due to the anticipated muddy conditions along the banks and high (3-4') water levels.

Any employee working in the boat or in the water must be wearing a personal floatation device (pfd) / life vest. The 10' Jon Boat selected for this project is designed and cannot exceed two personnel at a time. In addition, all personnel should bring a set of extra clothing with them to Site in case their clothes become wet or saturated.

Biological Hazards to Personnel

- ☐ Infectious/Medical/Hospital Waste ☒ Non-domesticated Animals ☒ Insects
☒ Poisonous Plants/Vegetation ☐ Raw Sewage

Training Requirements

- ☒ 40 Hour General Site Worker Course with three days supervised experience
☐ 24 Hour Course for limited, specific tasks with one day supervised experience
☒ 8 Hour Annual Refresher Health and Safety Training
☐ 8 Hour Management/Supervisor Training in addition to basic training course
☐ Site Specific Health and Safety Training
☐ Pre-entry training for emergency response skilled support personnel

Medical Surveillance Requirements

- ☒ Baseline initial physical examination with physician certification
☒ Annual medical examination with physician certification
☐ Site Specific medical monitoring protocol (Radiation, Pesticides, PCBs, Metals)
☐ Asbestos Worker medical protocol
☐ Exempt from medical surveillance _____
☐ Examination required in event of chemical exposure or trauma

Vehicle Use Assessment and Selection

Driving is one of the most hazardous and frequent activities for Weston Employees. As such, Weston Employees are required to adhere to established safe operating practices in order to maintain their eligibility to drive Weston owned, leased, or rented vehicles. Every person riding in a Weston vehicle, including passengers must maintain a commitment for a safe journey. This means being attentive while in the vehicle and helping the driver to notice hazards ahead of and around the vehicle and ensure that their presence does not distract the driver from safely operating the vehicle.

A high percentage of vehicle accidents occur when operating in reverse. Anytime a vehicle is operated in reverse, e.g., backing out of a parking area, if there are passengers, at least one of them are to assist the driver by acting as a guide person during the reverse movement or during other vehicle operation where it would be prudent to have a guide person(s) participate in the vehicle movement. When practical, the preferred parking method would be to back into the parking area.

At a minimum, each Weston Driver must:

- Possess a current, valid drivers' license
- Obey posted speed limits and other traffic laws
- Wear seat belts at all times while the vehicle is in operation
- Conduct a 360 degree inspection around the vehicle before attempting to drive the vehicle
- Report accidents / incidents immediately and complete a Notice of Incident (NOI)
- Keep vehicles on approved roadways (FWD doesn't guarantee mobility on unapproved surfaces)

All Region II RST personnel are experienced and qualified to drive RST fleet vehicles (Trailblazers, Suburbans, Cargo Van, and 10' x 12' Box Truck). However, in the event that vehicle rental is required, each person must take the time to familiarize themselves with that particular vehicle. This familiarization includes adjustment of the dashboard knobs/controls, mirrors, steering wheel, seats, and a 360 degree external inspection of the vehicle.

1. The following vehicles are anticipated to be used on this project:

- ☐ Car
- ☐ Pickup Truck
- ☐ Intermediate / Standard SUV (e.g. Chevy Trailblazer, Chevy Tahoe, Jeep Liberty, Ford Explorer)
- ☒ Full Size SUV (e.g., Chevy Suburban, Ford Expedition, GMC Yukon)
- ☐ Minivan / Cargo Van
- ☐ Box Truck (Size: _____) or Emergency Response Vehicle (ERV)
- ☐ Other _____

2. Are there any on-site considerations that should be noted:

- ☐ Working/Driving Surfaces, ☒ Debris, ☐ Overhead Clearance, ☐ Obstructions, ☒ Tire Puncture Hazards, ☒ Vegetation, ☐ Terrain, ☐ Parking, ☐ Congestion, ☐ Site Entry/Exit Hazards, ☐ Local Traffic Volume, ☐ Security, ☐ Heavy Equipment, ☒ Time/Length of Work Day

Do any of the considerations above require further explanation:

No

3. Are there any seasonal considerations that should be noted (e.g., Anticipated Snowy Conditions):

No

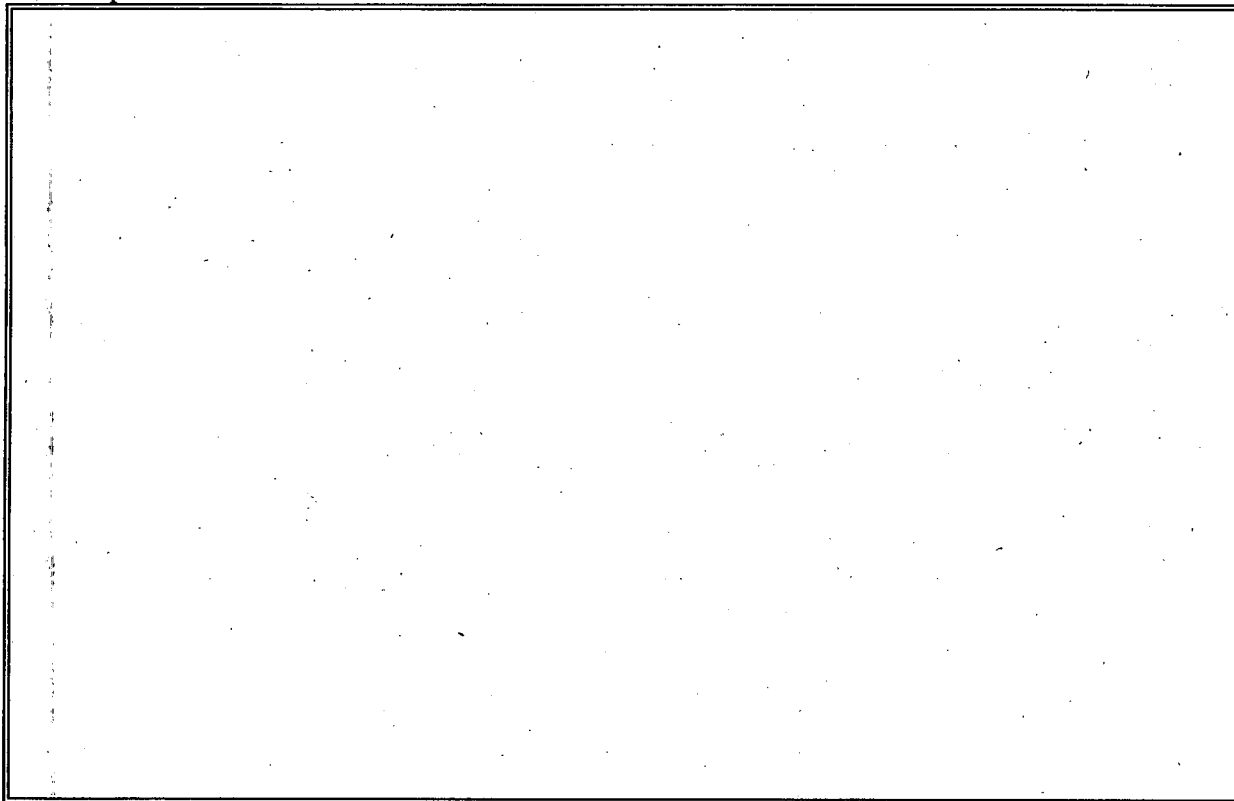
4. Is a Traffic Control Plan required? () Yes / (X) No.

If so, the Traffic Control Plan must be attached to this Health & Safety Plan.

Physical Parameters	Chemical Contaminant
Exposure Limits IDLH Level	Chlorodiphenyl (54% Cl) CAS 11097-69-1 _____ ppm <u>0.5</u> mg/m ³ PEL _____ ppm <u>0.001</u> mg/m ³ REL _____ ppm <u>Ca [5]</u> mg/m ³ IDLH
Physical Form (Solid/Liquid/Gas) Color	<u>X (below 50degF)</u> Solid <u>X</u> Liquid _____ Gas <u>Colorless to light colored or pale yellow</u> Color
Odor	Mild hydrocarbon odor
Flash Point Flammable Limits	<u>NA</u> Degrees F or C <u>NA</u> % UEL <u>NA</u> % LEL
Vapor Pressure	<u>0.00006</u> mm/Hg
Vapor Density	<u>NA</u> Air = 1
Specific Gravity	<u>1.38</u> Water = 1
Solubility	Insoluble
Incompatible Material	Strong oxidizers
Routes of Exposure	<u>X</u> Inh <u>X</u> Abs <u>X</u> Con <u>X</u> Ing
Symptoms of Acute Exposure	Eye irritant, chloracne, liver damage, reproductive effects, (potential occupational carcinogen)
First Aid Treatment	Irrigate eyes immediately for 15 minutes, remove to fresh air. If contacts skin, wash with soap immediately. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Seek medical attention immediately.
Ionization Potential	<u>N/A</u> eV
Instruments for Detection	_____ PID w/ _____ Probe _____ FID _____ CGI _____ RAD _____ Det Tube _____ pH Other <u>NIOSH 5503</u>

Control Measures

Site Map with work zones:



Work Zone Definitions:

Exclusion Zone - the area where contamination is either known or expected to occur and the greatest potential for exposure exists. The outer boundary of the Exclusion Zone, called the Hotline, separates the area of contamination from the rest of the site.

Contamination Reduction Zone (CRZ) - the area in which decontamination procedures take place. The purpose of the CRZ is to reduce the possibility that the Support Zone will become contaminated or affected by the site hazards.

Support Zone - the uncontaminated area where workers are unlikely to be exposed to hazardous substances or dangerous conditions. The Support Zone is the appropriate location for the command post, medical station, equipment and supply center, field laboratory, and any other administrative or support functions that are necessary to keep site operations running efficiently.

Communications:

(X) Buddy System () Radio () Air Horn for emergencies
(X) Hand Signals (X) Visual Contact

Personnel Decontamination Procedures:

- (X) Wet Decontamination (procedures as follows)
(X) Dry Decontamination (procedures as follows)

Used PPE will be placed in designated containers at the entrance to the hot zone and will be disposed of with the PPE generated by the EPA / USACE. Wash-water generated from the decontamination of chest-waders will be containerized in 55-gallon drums on-site and will be disposed of by the EPA / USACE.

Equipment Decontamination Procedures:

- (X) None
() Wet Decontamination (procedures as follows)
() Dry Decontamination (procedures as follows)

N/A

Adequacy of decontamination determined by: Site H&S Supervisor

Personal Protective Equipment

TASK TO BE PERFORMED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE OUTER GLOVE BOOT COVER	TYPE OF APR CARTRIDGE OR CANISTER
In-Stream Capacitor Search	Level D	Saranex or Tyvek and Chest Waders, PFD	Blue Nitrile/Blue Nitrile/ Booties	N/A
Floodplain / Wetland Capacitor Search	Level D	Saranex or Tyvek	Blue Nitrile/Blue Nitrile/ Booties	N/A

Frequency and Types of Air Monitoring: () Continuous () Routine (X) Periodic () Not Required

DIRECT READING INSTRUMENTS	MultiRAE CGI/O ₂ -H ₂ S-CO- PHOTO IONIZATION DETECTOR	Ludlum 19 Micro-R Meter/Ludlum Model 3 Survey Meter/Probe	Photovac MicroFID	Drager Chemical Detector Tube	OTHER
ID NUMBER					
CALIBRATION DATE					
RST MEMBER					
ACTION LEVEL	≥ 10 - 20% LEL (ConfinedSpace/non- ConfinedSpace) ≤ 19.5%, O ₂ Deficient ≥ 23% O ₂ - Enriched	3X BACKGROUND - CAUTION; 1 mR/HR - LEAVE	UNKNOWNNS: 1 - 5 UNITS - "C" 5-500 UNITS-"B"	PEL/TLV COMPARE WITH RESPONSE OF TUBE	

Emergency Telephone Numbers

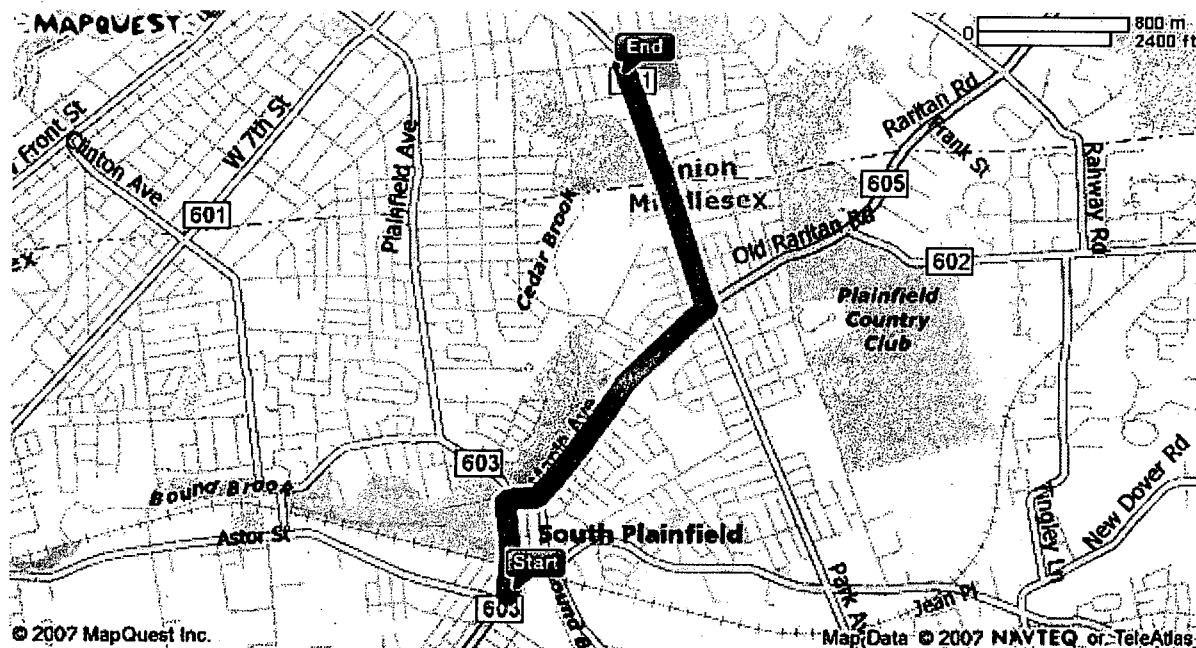
Emergency Contact	Location	Phone Number	Notified
Hospital *	Muhlenberg Regional Medical Center 1200 Randolph Road, Plainfield, NJ 07060	(908) 668-2000	Yes
Ambulance		911	No
Police	2480 Plainfield Avenue, South Plainfield, NJ 07080	911 or (908) 755-0700	No
Fire Department	123 Maple Ave. South Plainfield, NJ 07080	911 or (908) 226-7715	No

*Chemical Trauma Capability? (X) Yes () No

If no, closest backup: _____ Phone: _____

Directions to Hospital:

1. Start out going SOUTHWEST on HAMILTON BLVD toward LAKEVIEW AVE / CR-603
2. Turn SHARP RIGHT onto LAKEVIEW AVE / CR-603
3. Turn RIGHT onto MAPLE AVE / CR-602
4. Turn LEFT onto PARK AVE / CR-531
5. End at Muhlenberg Regional Med Ctr
(Approx. 2.5 miles, 8 minutes)



Route verified by: _____ Date: __/__/__

Additional Emergency Phone Contacts

WESTON Medical Emergency Service (Dr. Patrice Marshall, Medical Director)	800-874-4676 (Regular Business Hours)
WESTON Medical Emergency Service Dr. Frank Mitchell (After Hours)	404-898-4723
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-764-7661
Chemtel	800-255-3924
DOT	800-424-8802
CDC	800-232-0124

HASP prepared by: *John F. Brown* Date: 7/7/08
 Pre-Response/Entry Approval by: *John F. Brown* Date: 7/7/08
 Verbal Approval/Modification to Original HASP by: _____ Date: / /

Description of Site and Response Activities

Size of Site: _____

Terrain: _____

Weather: _____

Distance to Nearest: _____

Residence _____

School _____

Hospital _____

Public Building _____

Nearest Waterway: _____ - (name)

Other _____

Evacuation: ☐ Yes ☐ No

By Whom: _____

Condition	Observed	Potential	None	Comments/Observations
Surface Water Contamination				
Ground Water Contamination				
Drinking Water Contamination				
Air Release				
Soil Contamination				
Stressed Vegetation				
Dead Animal Species				

Action Taken On-Site:

Perimeter Monitoring: ☐ Yes ☐ No

Site entry by RST2: ☐ Yes ☐ No

Tasks Conducted	Level of Protection/Specific PPE Used

Hazardous Waste Site and Environmental Sampling Activities

Off Site: ☐ Yes ☒ No

On Site: ☐ Yes ☒ No

Describe types of samples and methods used to obtain samples: N/A

Was laboratory notified of potential hazard level of samples? ☐ Yes ☒ No

Note: The nature of the work assignment may require the use of the following procedures/programs which will be included as attachments to this HASP as applicable: Emergency Response Plan, Confined Space entry Procedures, Spill Containment Program.

Disclaimer: This Health and Safety Plan (HASP) was prepared for work to be conducted under the Removal Support Team 2 (RST2) Contract EP-W-06-072. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE

Final Submission of HASP by:		Date
Post Response Review by:		
Post Response Approval by:		
RST2 HSO Review by:		

Air Monitoring Summary Log

Date: __/__/

Data Collected by:

Station/Location	CGI/O ₂ Meter	Radiation Meter	PID	FID	Other (_____)

Summary/Comments (data to be summarized by a range of readings, i.e. "Low to High" and/or "Average" by location):

ATTACHMENT A

FLDS

FLD 05 HEAT STRESS PREVENTION AND MONITORING

Heat stress may occur at any time work is performed at elevated temperatures. If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur such as fatigue, irritability, anxiety, and decreased concentration or dexterity, and possibly death. Because heat stress is one of the most common and potentially serious illnesses at field sites, regular monitoring and other preventive measures are vital to ensure worker safety. Wearing chemical protective clothing often decreases natural body heat loss (cooling) and increases the risk of heat stress.

Employees who are taking prescription or over-the-counter medications should consult with their personal physician prior to working in high-temperature environments to see if their medication would impair their ability to handle heat stress.

REFERENCES

OSHA 29 CFR 1910 and 1926

RELATED FLDs

FLD 02 – Inclement Weather

FLD 03 – Hot Processes – Steam, Low Temperature Thermal Treatment Unit, and Transportable Incinerator

FLD 08 – Confined Space Entry Program

FLD 36 – Welding/Cutting/Burning

FLD 37 – Pressure Washers/Sandblasting

PROCEDURE

Heat Stress Symptoms and Treatment

Heat Rash

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation and is aggravated by chafing clothes. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impairs a worker's performance.

Symptoms – Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment – Decrease amount of time spent working in protective gear and provide body powder to help absorb moisture and decrease chafing. Heat rash can be prevented by showering, resting in a cool place, and allowing the skin to dry.

Heat Cramps

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water; however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping.

Symptoms – Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.

Treatment – Move the victim to a cool area and loosen clothing. Have the victim drink 1 to 2 cups of lightly salted water or diluted commercial electrolyte solution (e.g., Gatorade, Quench) immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery however, it is best to double the amount of water required by the dry mix package directions or add water to the liquid form.

Heat Exhaustion

Heat exhaustion is a state of weakness or exhaustion caused by the loss of fluids from the body. The condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms – Pale, clammy, and moist skin, profuse perspiring, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, may feel dizzy, and may be irritable or confused.

Treatment – Move the victim to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a position with the head lower than the feet (shock prevention), and allow the victim to rest. Consult a physician. Have the victim drink 1 to 2 cups of water immediately, and every 20 minutes thereafter until symptoms subside. Seek medical attention at the advice of the consulting physician.

Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms (i.e., the individual's temperature control system [sweating] stops working correctly). Body temperature rises so high that brain damage and death may result if the person is not cooled quickly.

Symptoms – Red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature, rapid respiratory and pulse rate, seizures or convulsions, unconsciousness or coma.

Treatment – Immediately call for emergency medical assistance. Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down quickly, permanent brain damage or death may result. Soak the victim in cool (not cold) water, sponge the body with cool water, or pour water on the body to reduce the temperature to a safe level (less than 102°F). Monitor the victim's vital signs. If possible, have the victim drink cool water. Do not give the victim coffee, tea, or alcoholic beverages.

Recognition and Risk Assessment

In the planning stages of a project, the potential for heat stress disorders must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely heat stress disorders that may occur. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

Prevention and Protection Programs

Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, level of personal protective equipment (PPE) worn, and environmental conditions (temperature, shade, and humidity). Site workers must learn to recognize and treat the various forms of heat stress. The following recommendations should be followed to prevent heat stress:

- The most important measure to prevent heat-related illness is adequate fluid intake. Workers should drink 1/2 to 1 quarts of liquids per hour in high heat conditions. Most of this liquid should be water. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. To prevent heat stress symptoms, the individual must ensure replacement of this fluid.
- Provide disposable cups that hold about 4 ounces, and water that is maintained at 50 to 60°F. Workers should drink 16 ounces of water before beginning work, and a cup or two at each break period.
- Provide a shaded area for rest breaks. Ensure that adequate shelter is available to protect personnel against heat and direct sunlight. When possible, shade the work area.
- Discourage the intake of caffeinated drinks during working hours.
- Monitor for signs of heat stress.
- Encourage workers to maintain a good diet during these periods. In most cases, a balanced diet and lightly salted foods should help maintain the body's electrolyte balance. Bananas are especially good for maintaining the body's potassium level.
- If utilizing commercial electrolyte mixes, double the amount of water called for in the package directions. Indications are that "full-strength" preparations taken under high heat stress conditions may actually decrease the body's electrolytes.
- Acclimate workers to site work conditions by slowly increasing workloads (i.e., do not begin work activities with extremely demanding tasks).
- Rotate shifts of workers who are required to wear impervious clothing in hot weather.
- Encourage workers to wear lightweight, light-colored, loose-fitting clothing.
- In extremely hot weather, conduct field activities in the early morning and evening.
- Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
- Good hygienic standards must be maintained by frequent showering and changes of clothing.
- Clothing should be permitted to dry during rest periods.
- Whenever working in the sun, provide employees with sunscreen with both UVA and UVB protection.
- Persons who notice skin problems should immediately consult medical personnel.

Heat Stress Monitoring and Work Cycle Management

When strenuous field activities are part of on-going site work conducted in hot weather, the following guidelines should be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress

problems. Consult the HASP and a safety professional (e.g., Division EHS Manager, FSO) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate – Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the rest period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.

Measure Body Temperature – When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the rest period. If the oral temperature exceeds 99.6°F (or 1 degree change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1 degree change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss – Body water loss greater than 1.5% of total body weight is indicative of a heat stress condition. Body weight is measured before PPE is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale; however, the scale must be sensitive to one-half pounds increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

NOTE: For purposes of this operating practice, a break is defined as a 15-minute period and/or until an individual's vital signs are within prescribed guidelines.

A physiological monitoring schedule is determined by following the steps below:

- Measure the air temperature with a standard thermometer.
- Estimate the fraction of sunshine by judging what percent the sun is out (refer to Table 1).
- Calculate the adjusted temperature based on the following formula:
Adjusted Temperature = Actual Temperature + 13 X (where X = sunshine fraction from Table 1)
- Using Table 2, determine the physiological monitoring schedule for fit and acclimated workers for the calculated adjusted temperature.

The length of work period is governed by frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature).

**Table 1. Percent Sunshine Factors
Heat Stress Prevention and Monitoring**

Percent Sunshine (%)	Cloud Cover	Sunshine fraction
100	No cloud cover	1.0
50	50% cloud cover	0.5
0	Full cloud cover	0.0

**Table 2. Physiological Monitoring Schedule
Heat Stress Prevention and Monitoring**

Adjusted Temperature	Level D (Permeable clothing)	Level C, B, or A (Nonpermeable clothing)
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8° - 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° - 87.5°F (28.1° - 32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° - 82.5°F (25.3° - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° - 77.5°F (22.5° - 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

Example: Site personnel anticipate wearing level C (impermeable clothing) during site activities. The air temperature is 80°F and there are no clouds in the sky (100% sunshine). The adjusted temperature is calculated in the following manner:

Adjusted Temperature (Adj T °F) = Actual Temperature (Amb T °F) + (13 x sunshine fraction)

Adj T °F = 80°F + (13 x 1.0)

Adj T °F = 93°F

Using Table 2, the pulse rate, oral temperature and body water loss monitoring would be conducted after each 15 minutes of work. The adjusted temperature may need to be redetermined if the percent sunshine and ambient temperature changes drastically during site work.

If an individual's heart rate exceeds 110 beats per minute at the beginning of the rest period, that individual will continue to rest until his or her heart rate drops to baseline; the next work period is then decreased by 33%.

FLD 11 ROUGH TERRAIN

RELATED FLDs

FLD 02 – Inclement Weather

FLD 05 – Heat Stress Prevention and Monitoring

FLD 06 – Cold Stress

FLD 22 – Heavy Equipment Operation

FLD 47 – Clearing, Grubbing, and Logging Operations

FLD 57 – Motor Vehicle Safety

HAZARD

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping.

Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles.

When working on foot, steep inclines and heavy or downed vegetation can hide holes or breaks in the terrain, increasing the risk of slips, trips, and falls.

RECOGNITION AND RISK ASSESSMENT

Rough terrain complicates work activities and adds to or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard and identified in the site-specific health and safety plan (HASP). Risk assessment is usually accomplished from site history information (i.e., site topography) and on site by the Field Safety Officer (FSO).

HAZARD PREVENTION AND PROTECTION PROGRAMS

Safety on Foot

Personnel working on rough terrain should maintain a high level of physical conditioning due to increased body stress and exertion.

The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls.

Boots should be ankle high or higher to provide additional support and stability.

Work will be completed in adequate natural light or sufficient illumination will be maintained.

Site personnel will conduct an initial walkover and the "buddy system" will be implemented.

Emergency communications such as a cell phone or two-way radio should be carried at all times.

Personnel should be aware of potential hazards and ensure the availability of first-aid supplies and knowledge of the location of the nearest medical assistance.

VEHICLE SAFETY

Vehicle drivers and passengers will wear seatbelts at all times.

Hazards can be prevented by ensuring regular maintenance is performed on vehicles and all safety features are working. Have brakes and wheel bearings of vehicles used off road or in four wheel drive inspected at increased frequency (suggest inspections at twice the manufacturer's recommended frequency).

In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths.

Minimize side hill travel. Travel straight up and down hills whenever possible. Passengers will not be allowed when side hill travel is required.

Take into account loads or superstructure of vehicles which raise the center of gravity and increase risk of tipping.

Cross streams, small logs or other passable (there is adequate clearance of the undercarriage) obstructions at right angles.

Four wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for two wheel drive vehicles by the FSO. Use of vehicles off-road will be specifically addressed in the HASP and personnel operating vehicles will be checked for proficiency.

- Before moving a vehicle in the field, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a vehicle before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Engage the all wheel drive when traveling off highway on hilly terrain.
- Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- After the vehicle/equipment has been moved to a new site, set all brakes and/or locks. When grades are steep, block the wheels.

Definitions

Class I, All-terrain vehicle (ATV): A motorized off-highway vehicle, 50 in. (127 cm) or less in width, having dry weight of 800 lbs (362.9 kg) or less, and traveling on three or more low pressure tires (10 lbs [4.5 kg] psi or less), with a seat designed to be straddled by the operator.

Class I, Category G, ATV: An ATV intended for general recreational and utility use.

Class I, Category U, ATV: An ATV intended primarily for utility use.

Class II, ATV: A motorized off-highway vehicle with a width which exceeds 50 in. (127 cm) or having a dry weight that exceeds 800 lbs (362.9 kg), traveling on four or more low-profile, low-pressure tires (10 lbs [4.5 kg] psi or less) and having a bench seat.

NOTE: Utility Vehicles are designed to perform off-road utility tasks such as passenger and cargo transportation and are addressed separately below. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Rollover Protective Structure (ROPS). A cab or frame that provides a safe environment for the tractor operator in the event of a rollover.

ALL TERRAIN VEHICLES (ATVS)

Qualifications

ATV operators will have completed a nationally recognized accredited ATV training course (such as provided by the Specialty Vehicles Institute of America or in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle.

The operator must pass an operating skills test prior to being allowed to operate an ATV. Proof of completion of this training will be maintained.

Equipment

All ATVs shall be equipped with:

- An operable audible warning device (horn);
- Headlights (if it will be used during hours of darkness);
- Taillights; and
- Brake lights.
- Mufflers and spark arresters.

All Class II ATVs will be equipped with ROPS and seatbelts

Operation

Only Class I and Class II ATVs with four or more wheels may be used. Class III ATV's may not be used.

The manufacturer's recommended payload will not be exceeded at any time.

Gloves and an approved motorcycle helmet with full-face shield or goggles will be worn at all times while operating a Class I ATV.

An ATV will not be driven on public roadways except to cross the roadway, and it will only be driven on a public roadway at designated crossing points or with a road guard (no paved road use unless allowed by the manufacturer).

A copy of the operator's manual will be kept on the vehicle and protected from the elements (if practicable).

Tires shall be inflated to the pressures recommended by the manufacturer.

Passengers are prohibited on Class I ATVs.

UTILITY VEHICLES

Utility vehicles are defined as specialty Class II ATVs designed to perform off-road utility tasks such as passenger and cargo transportation. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Utility vehicle operators shall be trained and familiar with the use of all controls; understand proper moving, stopping, turning and other operating characteristics of the vehicle. Operators must review all training materials provided by the manufacturer for the specific vehicles, and training should be in accordance with appropriate manufacturer recommendations. A copy of the operator's manual shall be kept on the vehicle at all times and protected from the elements. At a minimum, training should address:

- Basic riding tips from the manufacturer's published literature for each vehicle.
- Reading terrain.
- Climbing hilly terrain.
- Descending a hill.
- Traversing a slope.
- Riding through water.
- Cargo carriers and accessories.
- Loading and unloading.
- Troubleshooting.
- Proper preventative maintenance, (i.e., oil levels, tire pressure requirements and scheduled maintenance requirements according to the manufacturer's guidelines.).

Utility vehicles shall be equipped with:

- Operable audible warning device (horn).
- Headlights.
- Taillights.
- Brake lights.
- Seatbelts.
- ROPS.

Occupancy in utility vehicles is limited to manufacturer designated seating that has built-in seatbelts. Passengers may not ride in the vehicle's back cargo area unless the vehicle is otherwise equipped. Note: When used for emergency response, medical litters may be placed in the back cargo area but must be secured as described below.

The manufacturer's recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed shall not be exceeded at any time.

Cargo items will be secured as necessary to prevent movement/tipping. All loads over fifty pounds (to include medical litters) must be securely strapped to cargo tie-downs in the rear and to the cargo shelf in the front.

Seatbelts will be worn by operators and passengers of specialty vehicles where installed by the manufacturer. Operators and passengers shall wear goggles at all times when a utility vehicle, not equipped with a windshield, is in motion.

Utility vehicles will not normally be driven on public roadways except to cross the roadway, and will only be driven on a public roadway at designated crossing points or with a road guard. Utility vehicles that are allowed to operate outside a controlled work area and/or on public roads will meet the minimum vehicle safety standards in accordance with 49 CFR 571.5, to include ROPs, seatbelts and placement of "Slow Moving Vehicle" emblems where required.

Manufacturer-installed safety equipment will be maintained in working order and used in compliance with the requirement of this regulation and in accordance with manufacturer's recommendations.

RULES

Observe the following practices to help prevent accidents:

- Do not misuse utility vehicles.
- Reduce speed and exercise extreme caution on slopes or on rough ground.
- Do not overload vehicle and avoid shifting loads. Reduce load when operating over rough or hilly terrain.
- Do not stop or start suddenly when going uphill or downhill. Be especially cautious when changing direction on slopes.
- Stay alert for holes, rocks, and other hidden hazards in the terrain.
- Keep away from drop-offs, ditches, embankments, as well as ponds and other bodies of water. The machine could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
- Keep front wheels straight at crest of hill or going over bumps.
- When descending a hill, remove foot from accelerator and apply brakes to reduce speed and maintain control.

Transport Loads Safely

- Be sure load is evenly distributed.
- Do not load above the load guard.
- Securely anchor all loads in cargo box.
- Reduce cargo box capacity when operating on rough or hilly terrain.
- Use existing trails. Avoid terrain such as dangerous slopes and impassable swamps. Watch carefully for sharp bumps, holes, ruts, or obstacles.
- Look ahead at terrain. Know what is coming and be prepared to react. Be alert for hazards.
- Keep front wheels straight at the crest of a hill or going over bumps.
- Reduce speed according to trail, terrain, and visibility conditions.
- The passenger should always use the hand holds.

Climbing or Descending a Hill

- Always use the brakes when going down slopes, the utility vehicle can speed up (freewheel) going down a slope. Engine or clutch braking effect is minimal.
- Balance loads evenly and secure them. Braking could shift the load and affect vehicle stability.
- Sit on the center of the seat and keep both feet within the foot platform.
- Never drive past the limit of visibility. Slow down near the crest of a hill until getting a clear view of the other side.
- If the vehicle stops or loses power going up a hill, lock the park brake to hold the vehicle on slope. Maintain direction of travel and release the brake slowly. Back straight down hill slowly while maintaining control. Do not turn the vehicle sideways. The vehicle is more stable in a straight forward or rearward position.
- If the utility vehicle begins to tip, turn the front wheel downhill to gain control before proceeding.

Riding Through Water

- Avoid water whenever possible. If the drive belt becomes wet, slippage will occur and the vehicle will lose power.
- Never cross any body of water where the depth may be unknown to the operator. As an operational guideline, deep water is considered anything in excess of 152 mm (6 in.) in depth. Tires may float, making it difficult to maintain control.
- Choose a course within the waterway where both banks have a gradual incline. Cross at a point known to be safe.
- Proceed at a slow steady speed to avoid submerged obstacles and slippery rocks.
- Avoid water crossings where the operation of a utility vehicle may cause damage to waterway beds or erode waterway shoreline.

FLD 19 WORKING OVER OR NEAR WATER

RELATED FLDs

FLD02 – Inclement Weather

FLD05 – Heat Stress Prevention and Monitoring

FLD06 – Cold Stress

FLD18 – Operation and Use of Boats

FLD22 – Heavy Equipment Operation

FLD23 – Cranes, Rigging, and Slings

FLD24 – Aerial Lifts/Manlifts

FLD25 – Working at Elevation/Fall Protection

RECOGNITION AND HAZARD ASSESSMENT

Hazards associated with working around water include drowning, frostbite, hypothermia, and/or injury from falling into the water. Heat stress hazards may also be present. Carelessness, horseplay, or other unsafe acts could cause injury to personnel working over or near water. There are also hazards associated with untrained personnel operating equipment. Lack of personal protective equipment (PPE) or misuse of PPE could result in injury or death.

Proper precautions should be taken at all times when personnel are working over or near water. Whenever there is a body of water in close proximity to a work location, the proper safety procedures should be implemented. Requirements for equipment or procedures will be based on an evaluation of work tasks, drowning, and injury potential.

New field team members should be thoroughly indoctrinated in safe work practices pertinent to the work to which they are assigned.

PREVENTION AND PROTECTION PROGRAM

When working over or near water where there is potential for drowning, engineering controls such as installation of guardrails, toeboards, and other PPE such as safety line systems, shall be used to prevent personnel from falling into the water. In addition, flotation devices must be worn and other lifesaving devices must be present. Personal flotation devices (PFDs) should be designed to float unconscious or helpless persons face up.

Safety Nets

Safety nets must be provided when workplaces are more than 25 feet above the ground or water surface, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts is impractical.

- Where safety net protection is required, operations shall not be undertaken until the net is in place and has been tested.
- Nets shall extend 8 feet beyond the edge of the work surface where employees are exposed and shall be installed as close under the work surface as practical, but in no case more than 25 feet below such work surface. Nets shall be hung with sufficient clearance to prevent user's contact with the surfaces or structures below. Such clearances shall be determined by impact load testing.
- It is intended that only one level of nets be required for bridge construction.

- The mesh size of nets shall not exceed 6 inches by 6 inches. All new nets shall meet accepted performance standards of 17,500 foot-pounds minimum impact resistance, as determined and certified by the manufacturer, and shall bear a label of proof test. Edge ropes shall provide a minimum breaking strength of 5,000 pounds.

General Safety Precautions

Work shall be halted when significant wave action exists.

All general safety precautions will be adhered to when working over or near water to prevent accidents caused from careless behavior or horseplay.

Only personnel who are trained in the operation of marine equipment (e.g., boats, barges) will be allowed to operate the equipment.

Ramps for vehicle or personnel access to or between barges shall be of adequate strength, provided with guard rails, well-maintained and properly secured. For personnel access, a safe walkway may be substituted for the ramp. All access routes and passageways shall be kept free of ice, snow, grease, mud, and other obstructions. Nonslip surfaces shall be provided on all working decks, stair treads, ship ladders, platforms, catwalks, and walkways, particularly on the weather side of all doorways opening on deck.

Guardrails, bulwarks, or taut cable guardlines shall be provided for deck openings, elevated surfaces, and similar locations where persons may fall or slip. They shall be at least 42 inches high and have an intermediate rail.

If a Jacob's ladder is used, it will be of the double-rung or flat-tread type. It will be well-maintained and properly secured. The ladder will either hang without slack from its lashings or be pulled up entirely. When the upper end of the access-way rests on or is flush with the top of the bulwark (side of the ship above the upper deck), steps, properly secured and equipped with at least one hand rail approximately 33 inches in height, shall be provided between the top of the bulwark and the deck.

Obstructions will not be laid on or across gangways. The access-way will be adequately illuminated for its full length. All attempts will be made to place the access-way in a position that the load will not pass over personnel.

Any obstruction in a passageway that restricts normal passage shall be posted with warning signs or distinctively marked. Employees shall not be permitted to pass fore and aft, over or around the deck loads unless there is a safe passage. Decks and other working surfaces will be maintained in a safe condition and adequate safe walkways will be maintained for passage around the deck. All deck fittings and other obstructions that present stumbling hazards shall be painted yellow or marked with yellow trim.

Personnel will not walk along the sides of covered barges with coamings (raised frame to keep out water) more than 5 feet high unless there is a 3-foot clear walkway, a grab rail, or a taut handline.

Unless railings or other suitable protection exists, all personnel will use suitable protection against falling and/or drowning.

First-aid supplies should be aboard all lifesaving craft (or readily accessible) and arrangements for ambulance service should be made as location changes.

Personnel should be discouraged from jumping to or from any craft which is not secured, and from jumping between craft when a gangplank should be used.

Fall protection should be provided when working over or near water where there is a potential for falling or slipping into the water.

In areas subject to tidal flow or rising water levels, the Field Safety Officer (FSO) will monitor the water level to ensure that employees will not be trapped between a work area and the water level.

Life Saving Equipment

Equipment and procedures will conform to U.S. Coast Guard (USCG) and/or Occupational Safety and Health Administration (OSHA) requirements and applicable local regulations.

Personnel working over or near water shall be provided with USCG-approved PFDs (life jackets or buoyant work vests), which shall be worn whenever there is potential drowning hazard. PFDs should be designed to float unconscious or helpless persons face up.

Prior to and after each use, PFDs and life preservers shall be inspected for defects which would alter their strength or buoyancy (e.g., rips, tears, holes). All defective units shall be removed from the site and replaced. At no times will defective units be used.

USCG-approved life rings (rope attachment not required) and ring buoys (rope attachment required) should have attached at least 90 feet of 3/8-inch solid braid polypropylene rope or equal. The life rings or ring buoys shall be readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet. One ring buoy or life ring shall be provided on each lifesaving skiff.

Lights conforming to 16 CFR 161.012 will be required whenever there is a potential need for life rings to be used after dark. Lights on life rings are required only in locations where adequate general lighting (e.g., floodlights) is not provided.

In locations where waters are rough or swift, or where manually-operated boats are not practical, a power boat suitable for the waters shall be provided and equipped for lifesaving.

The maximum number of passengers and weight that can safely be transported shall be posted on all launches, motorboats, and skiffs. This number shall not be exceeded and in no case shall the number of passengers (including crew) exceed the number of PFDs aboard. Outboard motors and skiffs shall meet the minimum flotation requirements of the USCG. A certification tag affixed to the hull is satisfactory evidence of compliance. An efficient whistle or signal device shall be provided on all powered vessels to give signals required by the navigation rules applicable to the waters on which the vessel is operated.

Any vessel, except those easily boarded from the water, shall provide at least one portable or permanent ladder of sufficient length to rescue a person overboard.